ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

REPORT ON
ACTIVITIES ONE, TWO AND THREE

Greeley and Hansen
Chicago, Illinois

June 1984

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

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Report on Activities One, Two and Three

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A. Introduction

I. General

The following paragraphs describe the proposed Elkhart, Indiana Municipal Pretreatment Program and summarize the findings and conclusions of the work done under Activities 1, 2 and 3 of the pretreatment program guidance document.

II. Phase I Report

A preliminary survey to identify major industrial users and the nature of their discharges was completed by Snell Environmental Group, Inc. in December, 1979. A summary of the report is included in the Appendix.

3. Phase II Objectives

The objectives of the Phase II study are as follows:

(a) To update and expand the Phase I industrial user survey to comply with the General Pretreatment Regulations.

(b) To develop a pretreatment program for the City of Elkhart in compliance with all applicable state and federal regulations.

B. Activity One

I. Industrial User Survey

A master list of 303 industries in the City of Elkhart was prepared from the Industrial Directory compiled by the Greater

Elkhart Chamber of Commerce in September 1983. The list is shown in Attachment I.

A list of known or potential dischargers of process wastes was prepared using the industries listed in the 1979 Phase I Report. This list and the above master list were then reviewed with Mr. Kieth Meade of the Greater Elkhart Area Chamber of Commerce to develop the list of 93 industries in Attachment II. The criteria used to develop the list are as follows:

- Manufacturing process produces wastewater
- History of discharges causing problems at the POTW
- Major discharger (25,000 gpd or more)
- Inadequate information regarding products or processes
- Subject to EPA Categorical Standards

An industrial questionnaire, based on the form developed by the Indiana State Board of Health was mailed to the 93 selected industries, in November 1983. Completed questionnaires were received from 91 industries. One industry has relocated to another city and one industry has repeatedly refused to complete the questionnaire. This problem has been referred to the City Attorney for appropriate action.

An extensive program of follow-up letters, phone calls and visits to plants to ensure that all data requested was furnished has been completed. Approximately one week after the questionnaires were mailed, each industry was telephoned to confirm that the questionnaire had been received and to enquire if any assistance in completing the questionnaire was required. All industries

requesting assistance were visited. In all, over 400 phone calls and 35 plant visits were made. In addition, approximately 30 letters were sent to obtain additional information.

Copies of all questionnaires (Attachment III) have been submitted to the ISBH under separate cover.

The questionnaires have been carefully reviewed and a list has been compiled of 33 industries which discharge process wastes or contact cooling water to the POTW. These industries are listed in Attachment IV.

A map showing the locations of the 33 industries has been prepared and is also attached.

A file has been prepared for each industry discharging process wastes to the POTW. The questionnaire and all other data pertinent to the industry will be kept in the file. All of these files will be stored in metal filing cabinets in the office of the Pretreatment Program Director. All self-monitoring reports, compliance reports, scheduled and unscheduled sampling and analyses reports, and inspection reports will also be kept in these files. These data will be used to monitor the compliance of each industry with the pretreatment program.

Each industry found to be subject to EPA Categorical Pretreatment Standards or local effluent limits will be advised by letter sent certified mail, return receipt requested.

II. Technical Information

1. Operational History of the POTW

(a) Operational Problems

Miles Laboratories is currently discharging about 2 mgd of wastewater containing approximately 38,000 pounds per day of BOD_5 to the Elkhart POTW. This waste is from the production of citric acid and various enzyme products. This waste load constitutes approximately two-thirds of the BOD_5 loading to the wastewater treatment plant. The existing plant was designed for a much lower loading and has experienced problems related to the overloading of its secondary treatment system. These have included insufficient oxygen, odors, excessive sludge production and solids which settle and dewater poorly. These problems have resulted in violations of the NPDES permit conditions as shown in the attached charts of the plant influent and effluent BOD and suspended solids from 1980 to 1983, inclusive.

The heavy overloading of the wastewater treatment plant with conventional pollutants may have masked problems caused by other pollutants. An examination of data obtained from recent sampling and analyses of the plant influent indicate that the concentrations of copper, nickel and cyanide exceed the estimated tolerance limits of the activated sludge process. None of the priority pollutant concentrations in the sludge exceed the estimated tolerance limits of the anaerobic digestion process.

(b) Sources of Toxic Wastes

The major dischargers of some or all of the above toxic pollutants are as follows:

Anderson Silver Plating, Inc.
W. T. Armstrong Co., Inc.
Atlas Chemical Milling Division
Vincent Bach Company
CTS Corporation
Elkhart Products Corporation
Ideal Plating Corporation
NIBCO

(c) Corrective Actions

Corrective actions taken to resolve the above problems include the following:

- Miles Laboratories

  An agreement has been reached with Miles Laboratories to limit the waste load from this source. The current expansion of the POTW has been designed to treat a Miles Laboratories BOD_5 contribution of up to 14,000 pounds per day. This represents approximately 37 percent of the design BOD_5 loading. Miles will achieve this load reduction by installing extensive pretreatment facilities which are required by the agreement to be fully operational by January 1986.

. Sewer Ordinance

Ordinance No. 3171, Sewer Use and Rate Ordinance of the City of Elkhart includes the following limitations on toxic pollutants discharged to the POTW.

Pollutant	Max. Conc. mg/l
Cadmium	0.20
Chromium (+6)	0.25
Copper	2.00
Cyanide (T)	0.64
Cyanide (A)	0.20
Lead	1.00
Mercury	0.02
Nickel	0.80
Silver	0.10
Zinc	0.50

. Pretreatment

The following industries have installed or are in the process of installing pretreatment facilities:

Anderson Silver Plating Company
W. T. Armstrong
Vincent Bach I
CTS Corporation Mam Plant
McDowell Industries
Miles Laboratories
NIBCO

(d) Effect on St. Joseph River

As shown in Table II-1, the concentrations of copper, cyanide and silver in the plant effluent have approached or exceeded the allowable concentration based on dilution in 50 percent the 7-day, 10-year minimum flow in the St. Joseph River. It is apparent that such concentrations, could have a detrimental

TABLE II-1

ELKHART, INDIANA
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Water Quality Limitations

	Concentration mg/l			
	River Water Quality		POTW Effluent	
Pollutant	Standard	Existing	Limit(2)	Existing
Antimony	1.60	0.40(1)	16.30	<0.01
Arsenic	0.1	0.002	1.30	<0.005
Beryllium	0.0053	0.0013(1)	0.05	<0.01
Cadmium	0.02	0.002	0.24	<0.02
Chromium	0.25	0.01	3.19	0.15
Copper	0.02	0.006	0.19	0.38
Cyanides	0.025	0.005	0.27	0.23
Lead	0.05	0.01	0.54	<0.10
Mercury	0.0005	0.0001	0.0054	0.0006
Nickel	0.5	0.01	6.50	0.69
Selenium	0.035	0.009(1)	0.35	<0.05
Silver	0.005	0.001(1)	0.054	<0.05
Thallium	0.040	0.010(1)	0.41	<0.01
Zinc	1.0	0.016	13.05	0.13
Carbon tetrachloride	1.408	0.352(1)	14.344	0.0076
Chloroform	1.156	0.320(1)	12.51	NQ
1,1 Dichloroethylene	0.464	0.116(1)	4.727	ND
1,2 Trans Dichloroethylene	0.464	0.116(1)	4.73	0.007
Methylene Chloride	0.10	0.025(1)	1.02	0.020
Phenols	0.100	0.004	1.276	<0.1
Tetrachloroethylene	0.840	0.210(1)	8.557	0.014
Toluene	0.700	0.175(1)	7.131	0.004
1,1,1 Trichloroethane	9.4	2.35(1)	95.76	NQ
Trichloroethylene	1.800	0.450(1)	18.337	0.016

(1) Assumed to be 25% of Standard.
(2) Based on 20 mgd effluent and 50% of 490 mgd 7-day, 10-year minimum flow in St. Joseph River.
ND - Not detected.
NQ - Not quantifiable.

effect on aquatic life. To the best of our knowledge, however, specific problems have not been attributed to such discharges.

(e) Current Sludge Disposal Practice

The existing sludge treatment facilities include degritting cyclones, gravity thickeners, anaerobic digesters, a heat conditioning system, a conditioned sludge decant tank, dewatering centrifuges, a chemical feed system, a fluidized sand bed incinerator and ash thickening and dewatering facilities. All of the sludge treatment facilities, except for the digesters, are out of service and all except the degritting cyclones, gravity thickeners, anaerobic digesters and chemical feed system will be removed under the present plant improvement program. Present sludge treatment, therefore, consists of anaerobic digestion of primary, waste activated and alum sludges. Alum is used for the removal of phosphorus.

Until recently, most of Elkhart's sludge was spread on a 160-acre city-owned farm, greatly in excess of recommended application rates. This practice has been disconnected and sludge is now disposed of entirely on private farms.

The present and projected quantities of sludge are summarized as follows:

Item	Present	Projected
Sludge to Digesters		
Flow, mgd	0.10	0.16
Solids, percent	4.00	4.00
lbs/day	33,320	52,320
Digested Sludge		
Flow, mgd	0.10	0.16
Solids, percent	3.35	2.75
lbs/day	27,900	36,700
Dewatered Sludge		
Pounds/day, dry	--	33,030
Cu Yds/day	--	113

The estimated characteristics of Elkhart's sludge are shown in Table II-2. The Indiana State Board of Health has determined that this sludge is suitable for landfilling and landspreading as now practiced and as planned for the future.

Studies made to develop a sludge management plan for Elkhart concluded that landfilling is the most cost-effective method of sludge disposal. Landfilling has, therefore, been selected as the principal method of disposal, with some sludge continuing to be spread on private farms. Sludge dewatering facilities are now under construction.

Reductions in the concentrations of toxic pollutants in the sludge would not affect its disposal in a landfill. Reduction in the concentrations of some of the metals would increase the total amount of sludge that could be applied per acre of land. Since landspreading is a minor part of the sludge management plan, it is considered that sludge disposal options are not limited by toxic pollutants in the sludge.

TABLE II-2

ELKHART, INDIANA
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Digested Sludge Characteristics[1]

Total Solids, percent	2.8
Volatile Solids, percent of TS	4.3
Nutrients (percent of dry solids)	
Total Kjeldahl Nitrogen	6.0
Ammonia Nitrogen	1.75
Nitrite Nitrogen	0.003
Phosphorus	1.1
Potassium	0.3
Other Constituents (mg/KG)	
Cadmium	8.0
Chromium	400
Copper	1,000
Lead	150
Mercury	0.70
Nickel	100
Zinc	1,000
Boron	1.5
Arsenic	15.0
Selenium	0.25
PCB	<5

1. Based on Tables 3-3 and 3-4, Elkhart, Indiana Sludge Management Plan Final Report, Greeley and Hansen, November 1981.

(f) Effect of Overflows

As shown in Table II-3, all industries discharging process wastes are tributary to one or more combined sewer overflows. Only two overflows per industry are identified, as it is considered that overflows occurring beyond the second point will very dilute.

The annual amount of each priority pollutant discharged through combined sewer overflows and the amount discharged during the maximum 4-hour rainfall to be expected once per year have been estimated as shown in Table II-4. The estimated quantities are based on the reported amounts discharged by industry and on the assumption that the percentage of each pollutant discharged is equal to the overall percentage of combined storm water and wastewater discharged through combined sewer overflows. Data regarding combined sewer overflows were obtained from Greeley and Hansen's April 1982 Combined Sewer Overflow Study, Phase 1, Interim Report.

Table II-4 also shows the corresponding estimated concentrations of each pollutant in the St. Joseph River based on 50 percent of the 7-day, 10-year minimum flow, together with the maximum concentrations permitted under the present waster quality standards. It appears that, with the exception of copper and possibly cyanide, combined sewer overflows of priority pollutants have an insignificant effect on river water quality.

TABLE II-3

ELKHART, INDIANA
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Industries Tributary to Combined Sewer Overflows

Industry	CSO No.	Overflow Location
1. AACOA	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
2. Accra-Pac	33	Evans and Grace
	2	Middlebury and Grand
3. Adams and Westlake	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
4. Anderson Silver Plating	33	Evans and Grace
	2	Middlebury and Grand
5. W. T. Armstrong	33	Evans and Grace
	2	Middlebury and Grand
6. Atlas chem Milling	24	Indiana and Franklin
	20	Bridge and Hudson
	37	Franklin and Krau
7. Atlas Steel Rule Die	33	Evans and Grace
	2	Middlebury and Grand
8. Vincent Bach 1 & 2	33	Evans and Grace
	2	Middlebury and Grand
9. Bergerson Screw Products	13	Johson and Beardsley
	12	Cassopolis and Beardsley
10. E. L. Blessing	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
11. CTS Corp. (Both Plants)	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
12. Conrail	24	Indiana and Franklin
	20	Bridge and Hudson
	37	Franklin and Krau

(Continued)

TABLE II-3 (Continued)

Industry	CSO No.	Overflow Location
13. Domore	31	Elizabeth and Lusher
14. Don's Printing Service	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
15. Durakool	12	Cassopolis and Beardsley
16. Elixir	33	Evans and Grace
	2	Middlebury and Grand
17. Elkhart General Hospital	40	McHaughton Park South
18. Elkhart Products	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
19. Franklin Press	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
20. G & W Industries	31	Elizabeth and Lusher
21. Hackney, Inc.	15	Michigan and Fulton
	19	Michigan (S. of Lexington)
22. Hermaseal	37	Franklin and Krau
	20	Bridge and Hudson
	24	Indiana and Franklin
23. ILC Prods.	37	Franklin and Krau
	20	Bridge and Hudson
	24	Indiana and Franklin
24. IMC Prods.	37	Franklin and Krau
	20	Bridge and Hudson
	24	Indiana and Franklin
25. Ideal Plating	37	Franklin and Krau
	20	Bridge and Hudson
	24	Indiana and Franklin

(Continued)

TABLE II-3 (Continued)

Industry	CSO No.	Overflow Location
26. Impressions Inc.	33 2	Evans and Grace Middlebury and Grand
27. Indiana Plastics	33 2	Evans and Grace Middlebury and Grand
28. Ken's Quality Print Shop	34 39	Lexington at 6th W. High at River
29. Kent Co.	33 2	Evans and Grace Middlebury and Grand
30. Kiefer and Sons	13 12	Johnson and Beardsley Cassopolis and Beardsley
31. LaBour Pump	5 4	Arch and Bar McDonald and Grand
32. Lifeline Biologicals	24	Indiana and Franklin
33. McDowell Enterprises	33 2	Evans and Grace Middlebury and Grand
34. Michiana Industrial Finishing	15 19	Michigan and Fulton Michigan (S. of Lexington)
35. Miles Laboratories	15 19	Michigan and Fulton Michigan (S. of Lexington)
36. NIBCO	33 2	Evans and Grace Middlebury and Grand
37. Phillips Industries (Proposed)	33 2	Evans and Grace Middlebury and Grand
38. Selmer	12	Cassopolis and Beardsley
39. Standard Tool and Machine	15 19	Michigan and Fulton Michigan (S. of Lexington)

(Continued)

TABLE II-3 (Continued)

Industry	CSO No.	Overflow Location
40. Taylor Products	15 19	Michigan and Fulton Michigan (S. of Lexington)
41. Teledyne Metal Forming	5 4	Arch and Bar McDonald and Grand
42. Truth Publishing Company	23	Franklin and 8th
43. Walter Piano Co.	15 19	Michigan and Fulton Michigan (S. of Lexington)
44. Whitehall Laboratories	33 2	Evans and Grace Middlebury and Grand

TABLE II-4
ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Combined Sewer Overflows

Pollutant	Reported Discharge lbs/Yr	Overflow - lbs		Concentration in River ug/l(3)		
		Annual(1)	4-hr Max(2)	Average	4-hr Maximum	Standard
Arsenic	>1	-	-	-	-	100
Cadmium	48	5	0.1	0.010	0.294	20
Chromium	1,084	108	1.4	0.212	4.116	250
Copper	3,099	310	4.1	0.607	12.054	20
Cyanide	782	78	1.0	0.153	2.940	25
Lead	242	24	0.3	0.047	0.882	50
Mercury	<1	-	-	-	-	0.5
Nickel	2,065	207	2.7	0.406	7.938	500
Selenium	<1	-	-	-	-	35
Silver	15	2	-	0.004	-	5
Zinc	2,131	213	2.8	0.417	8.232	1,000
Trichloroethene	82	8	0.1	0.016	0.294	1,800
Trichloroethane	120	12	0.2	0.023	0.588	9,400
Methylene Chloride	320	32	0.4	0.063	1.178	100
Toluene	400	40	0.5	0.078	1.470	700

1. At 10% of reported discharge to sewers.
2. At 98% of reported discharge to sewers for 4 hours, assuming discharge occurs 8 hours per day, 250 days per year.
3. Based on 50% of 7-day, 10-year minimum flow.

2. POTW Sampling

One 24-hour composite sample each of the POTW influent, effluent and digested sludge were collected on February 16, 1984 and analyzed for all priority pollutants. These analyses demonstrated that all of the toxic metals are present in the influent, effluent and digested sludge. Of the toxic organic chemicals, only phenols and nine volatile organic chemicals were detected in the influent and effluent. Only phenols were detected in the digested sludge.

Additional 24-hour composite samples of the influent and effluent were obtained on March 12, 1984 and March 17, 1984 and a 24-hour composite of typical non-industrial wastewater was obtained on March 12, 1984. These samples, together with a laboratory-prepared sample of dewatered digested sludge were analyzed for the chemicals detected in the February 16th samples. The results of these analyses are given in Table II-5.

Some additional data are available from the Phase 1 study and from the present monitoring program. These have been used to verify the reasonableness of the newly collected data.

3. Bases for Evaluation of Data

The Elkhart Wastewater Treatment Plant is currently being expanded to provide adequate capacity for the anticipated 2000 wastewater quantities and characteristics. The treatment process will include the following steps:

TABLE II-5

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Sampling and Analytical Data

Pollutant	February 16, 1984 Concentration(1) Influent	February 16, 1984 Concentration(1) Effluent	February 16, 1984 Percent Removed	March 12, 1984 Concentration(1) Influent	March 12, 1984 Concentration(1) Effluent	March 12, 1984 Percent Removed	March 17, 1984 Concentration(1) Influent	March 17, 1984 Concentration(1) Effluent	March 17, 1984 Percent Removed	March 12, 1984 Concentration(1) Digested	March 12, 1984 Concentration(1) Dewatered	March 12, 1984 Concentration(1) EP Toxicity(2)
Antimony	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<4.5	<2.81	<0.01
Arsenic	<0.0025	<0.0025	-	<0.005	<0.005	-	-	-	-	3.92	18.3	<0.005
Beryllium	<0.001	<0.001	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.5	<2.81	<0.01
Cadmium	0.08	<0.02	75	<0.02	<0.02	-	<0.02	<0.02	-	<15	1.86	<0.02
Chromium (T)	0.17	0.15	12	0.12	<0.10	17	<0.10	<0.10	-	668	76.1	<0.1
Copper	1.61	0.38	76	0.21	<0.05	76	0.10	0.05	50	1,370	197	<0.05
Cyanide (T)	0.29	0.10	65	0.01	<0.01	-	0.01	0.23(3)	-	22.6	3.48	0.01
Lead	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	169	23.6	<0.1
Mercury	0.0006	0.0006	0	<0.0005	<0.0005	-	<0.0005	<0.0005	-	3.37	1.17	<0.0002
Nickel	1.45	0.69	52	0.14	0.22	-	0.42	0.22	48	199	26.4	0.47
Selenium	<0.0025	0.003	-	<0.005	<0.005	-	<0.005	<0.005	-	<5.49	<2.61	<0.005
Silver	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	27.6	6.95	<0.1
Thallium	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<4.45	<2.81	<0.01
Zinc	0.60	0.13	78	0.20	0.07	65	0.06	0.08	-	2,080	213	<0.05
Carbon tetrachloride	0.031	0.0076	75	ND	ND	-	ND	ND	-	ND	ND	-
Chloroform	0.068	ND	100	0.008	NQ	100	NQ	NQ	-	ND	ND	-
1,1 Dichloroethylene	0.050	ND	100	ND	ND	-	ND	ND	-	ND	ND	-
1,2 Trans Dichloroethylene	ND	ND	-	0.036	0.007	81	0.032	NQ	100	ND	0.13	-
Methylene Chloride	ND	ND	-	0.042	0.020	52	0.017	0.012	30	ND	0.08	-
Phenol	0.22	<0.1	54	0.24	<0.1	58	0.25	<0.1	60	7.42	<12	<0.1
Tetrachloroethylene	0.0073	ND	100	0.010	0.002	80	0.023	0.014	39	ND	0.017	-
Toluene	0.037	ND	100	0.004	NQ	100	0.004	0.004	0	ND	1.90	-
1,1,1 Trichoreothane	ND	ND	-	0.003	NQ	100	NQ	NQ	-	ND	ND	-
Trichloroethylene	0.042	0.012	71	0.078	0.016	80	0.077	0.016	79	ND	ND	-

1. Digested and dewatered sludge in mg/k; others in mg/l.

2. Concentration in EP Toxicity Test extract from dewatered sludge.

3. April 23, 1984.

ND Not detected.

NQ Not quantifiable.

- Preliminary treatment
- Primary clarification
- Aeration
- Secondary clarification
- Disinfection with chlorine
- Sludge thickening
- Anaerobic sludge digestion
- Sludge dewatering
- Sludge landfilling
- Sludge landspreading

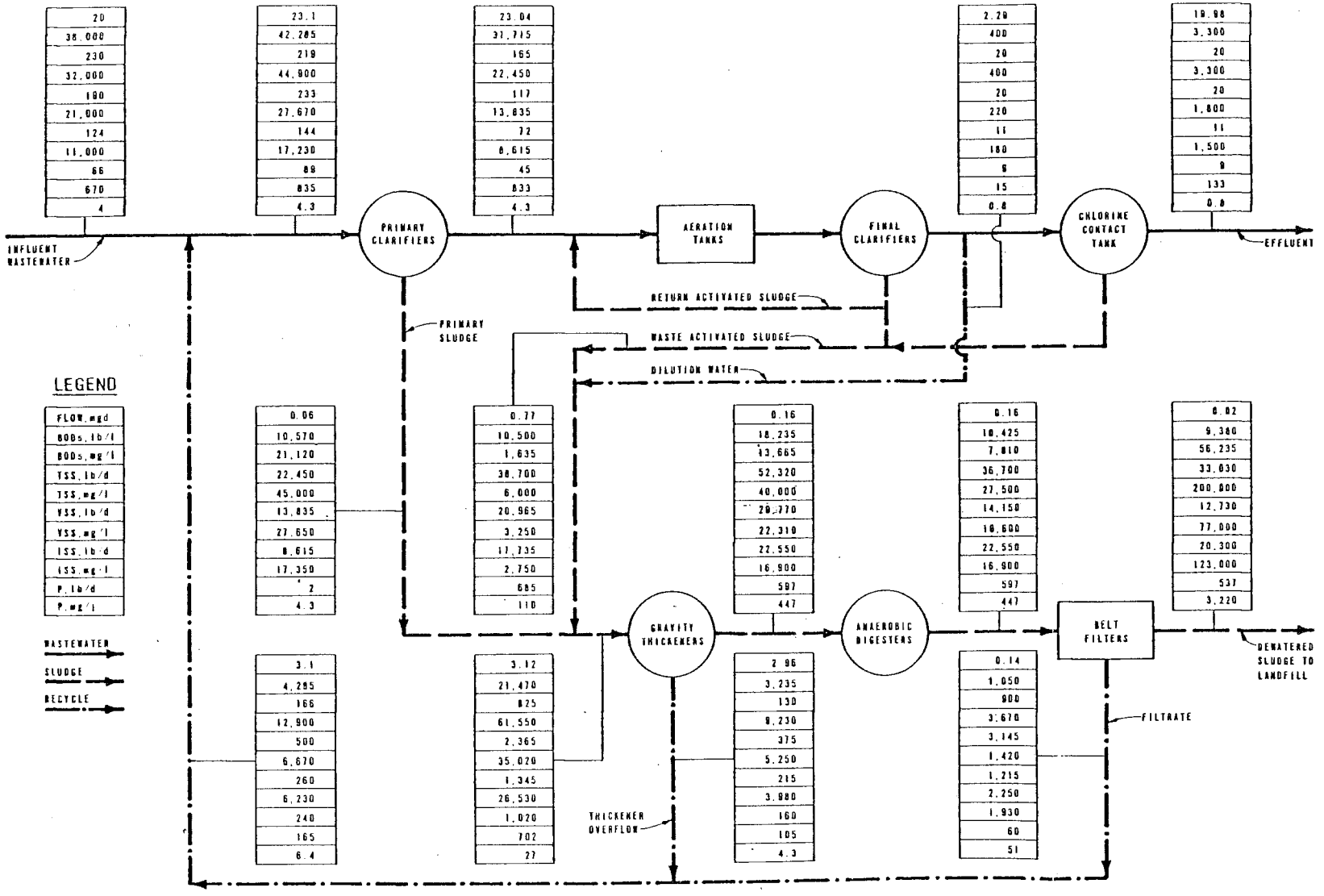
The completed plant will have a design annual capacity of 20 mgd. Figure II-1 is a schematic diagram of the treatment process.

To provide a basis on which to evaluate the data obtained, state and federal regulations have been reviewed and the literature searched for the following information:

- Water quality standards for the St. Joseph River
- Tolerance limits of the activated sludge process to the priority pollutants detected in the POTW influent
- Tolerance limits of the anaerobic digestion process to the priority pollutants detected in the digested sludge
- Percent removal of priority pollutants detected in the POTW influent by the activated sludge process
- Limiting concentration of priority pollutants in sludge disposed of in sanitary landfills
- Limiting concentrations of priority pollutants in sludge disposed of by land spreading

The values considered to be most applicable to conditions at Elkhart are summarized in Table II-6.

FIGURE II-1



MASS BALANCE DIAGRAM

(ANNUAL AVERAGE CONDITIONS)

GREELEY AND HANSEN
ENGINEERS

ELKHART, INDIANA
WASTEWATER TREATMENT
FACILITY PLAN

TABLE II-6

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Limiting Concentrations and Percent Removal of Pollutants

Priority Pollutant	Limiting Concentration(1)					
	St. Joseph River	Activated Sludge	Anaerobic Digestion	Sludge		Percent Removed
				Landfill	Landspread	
Antimony	1.60	0.1	25	4,102	-	62
Arsenic	0.10	0.05	1,000	18,300	-	65
Beryllium	0.0053	0.1	12.5	0.11	-	32
Cadmium	0.02	1.0	2,375	93	74	78
Chromium (T)	0.25	10.0	2,000	76,100	-	78
Copper	0.02	1.0	3,750	394,000	2,200	72
Cyanide (T)	0.025	0.1	3,000	796	-	62
Lead	0.05	0.1	4,250	1,180	8,300	85
Mercury	0.0005	0.1	875	1,170	-	70
Nickel	0.5	1.0	2,000	72	2,200	36
Selenium	0.035	0.1	1,750	522	-	55
Silver	0.005	5.0	300	345	-	68
Thallium	0.040	0.1	12.5	365	-	44
Zinc	1.0	1.0	5,000	2,130,000	4,400	72
Carbon tetrachloride	1.408	3	250	-	-	94
Chloroform	1.156	1	200	-	-	94
1,1 Dichloroethylene	0.464	10	175	-	-	93
1,2 Trans Dichloroethylene	0.464	10	1,250	-	-	79
Methylene Chloride	0.10	100	1,250	-	-	72
Phenols	0.1	50	200	42,000	-	97
Tetrachloroethylene	0.840	20	37.5	-	-	81
Toluene	0.700	20	5,375	-	-	94
1,1,1 Trichloroethane	9.4	30	125	-	-	80
Trichloroethylene	1.800	20	250	-	-	83

(1) Concentration in sludge in mg/kg; others in mg/1.

(a) Water Quality Standards

The Elkhart Wastewater Treatment Plant discharges to the St. Joseph River. Water quality requirements for this river are established in the State of Indiana Regulation 330 IAC 1-1, Water Quality Standards and Minimum Treatment Requirements Applicable to All State Waters. These regulations require that the St. Joseph River be protected for agricultural uses, domestic and industrial use at the points where water is withdrawn, warm water fish and whole body contact recreation.

Water quality limits for each of the toxic substances detected in the POTW influent samples are given in Table II-6. The limits for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, silver, zinc and phenols were provided by the ISBH. The limits for other pollutants were derived from the Water Quality Criteria presented in the EPA Guidance Manual for POTW Pretreatment Program Development, October 1983. These limits are to protect fresh water aquatic life subject to chronic exposure to toxic substances. In calculating the allowable POTW effluent concentration it is assumed that the effluent is diluted with a volume of river water equal to 50 percent of the minimum 7-day, 10-year flow.

(b) Tolerance to Pollutants

Excessive levels of toxic substances can inhibit the biological processes necessary for proper operation of the POTW. Table II-7 shows the levels at which toxic substances detected in the POTW influent are considered by various investigators to

TABLE II-7

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Activated Sludge Tolerance Limits

Priority Pollutant	Tolerance Limit mg/l (1)	(2)	(3)	(4)	(5)	Proposed
Antimony	-	-	-	0.2	-	0.1
Arsenic	0.05	-	0.1	0.08	0.1	0.05
Beryllium	-	-	-	0.004	-	0.1
Cadmium	1.0	1.0	1.0	1.8	1-10	1.0
Chromium (T)	10.0	2.0	-	2.4	1-10	10.0
Copper	1.0	1.0	1.0	2.3	1.0	1.0
Cyanide (T)	0.1	2.0	-	7.6	0.1-5	0.1
Lead	0.1	1.0	0.1	2.5	1-5	0.1
Mercury	0.1	-	0.1	4.0	0.1-1	0.1
Nickel	1.0	1.0	1.0	6.0	1-2.5	1.0
Selenium	-	-	-	0.01	-	0.1
Silver	-	-	5.0	0.3	0.25-5	5.0
Thallium	-	-	-	0.02	-	0.1
Zinc	1.0	2.0	30.0	9.2	0.3-5	1.0
Carbon tetrachloride	-	-	2.9	1.9	-	3
Chloroform	-	-	1	0.4	-	1
1,1 Dichloroethylene	-	-	>10	1.2	-	10
1,2 Trans Dichloroethylene	-	-	>10	0.2	-	10
Methylene Chloride	-	-	100	49	-	100
Phenols	-	-	4	1.4	50-200	50
Tetrachloroethylene	-	-	20	5.7	-	20
Toluene	-	-	>35	13	200	20
1,1,1 Trichloroethane	-	-	>10	30	-	30
Trichloroethylene	-	-	20	1.8	-	20

1. ISBH, Development of Local POTW Limitations for the Control of Incompatible Pollutant Discharges, June 1982.
2. MDNR, Michigan Industrial Pretreatment Guidebook, Oct. 1982.
3. Russell, etal, Impact of Priority Pollutants on Publicly Owned Treatment Works Processes. A Literature Review. Proceedings 37th Ind. Wast Conf. Purdue U. 1982.
4. USEPA, Fate of Priority Pollutants in POTW's EPA 440/1-82/303 (Max. observed).
5. Anthony & Breimhurst, Determining Maximum Influent Concentrations of Priority Pollutants for Treatment Plants J. WPCF 53 1981.

inhibit the activated sludge process. It is proposed to use the limits recommended by the ISBH for all toxic substance for which they are available. Proposed limits for other toxic substances have been selected conservatively from the data available.

Table II-8 shows the levels at which toxic substances detected in the POTW influent are likely to inhibit the anaerobic digestion process. Applying these data to the Elkhart POTW is difficult since the toxicity of metals is significantly affected by the total amount of metals and the amount of sulphides in the sludge. These data are generally not available for the references cited. To be conservative, therefore, the proposed limits have been set at approximately 50 percent of the maximum limits found in the references.

(c) Removal of Pollutants

Tables II-9 and II-10 show data from several sources regarding the removal of priority pollutants by primary and secondary treatment respectively. Table II-11 shows the primary, secondary and over-all removal of priority pollutants expected to be accomplished by the completed Elkhart POTW. These are generally somewhat higher than the removals achieved by the existing overloaded plant.

TABLE II-8

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Anaerobic Sludge Digestion Tolerance Limits

Priority Pollutant	Tolerance Limit mg/l (1)*	(2)	(3)	(4)	(5)	Proposed	Proposed** mg/kg
Antimony	-	-	-	2	-	1	25
Arsenic	1.5	80	1.6*	6	-	40	1,000
Beryllium	-	-	-	<1	-	0.5	12.5
Cadmium	0.02	195	20	95	5.2	95	2,375
Chromium (T)	100	73	110	160	-	80	2,000
Copper	10	291	40	180	0.48	150	3,750
Cyanide (T)	4	236	4*	286	0.34	120	3,000
Lead	-	-	340	170	0.5	170	4,250
Mercury	-	-	65	690	-	35	875
Nickel	10	157	10	84	-	80	2,000
Selenium	-	-	-	140	-	70	1,750
Silver	-	-	-	24	-	12	300
Thallium	-	-	-	<1	-	0.5	12.5
Zinc	20	73	400	1100	0.03	200	5,000
Carbon tetrachloride	-	-	10-20*	3	2.9	10	250
Chloroform	-	-	10-16*	0.4	1	8	200
1,1 Dichloroethylene	-	-	-	14	-	7	175
1,2 Trans Dichloroethylene	-	-	-	96	-	50	1,250
Methylene Chloride	-	-	-	10	100	50	1,250
Phenols	-	-	-	17	-	8	200
Tetrachloroethylene	-	-	-	3	-	1.5	37.5
Toluene	-	-	-	427	-	215	5,375
1,1,1 Trichloroethane	-	-	-	11	-	5	125
Trichloroethylene	-	-	20*	33	20	10	250

1. ISBH, Development of Local Limitations for the Control of Incompatible Pollutant Discharges, June 1982.
2. MDNR, Michigan Industrial Pretreatment Guidebook, October 1982.
3. Anthony & Breimhurst, Determining Maximum Influent Concentrations of Priority Pollutants for Treatment Plants J. WPCF 53 1981.
4. USEPA, Fate of Priority Pollutants in POTWs, EPA 440/1-82/303 (Max. detected).
5. Russell, etal, Impact of Priority Pollutants on Publicly Owned Treatment Works Processes. A Literature Review, Proceedings 37th Ind. Waste Conf. Purdue U. 1982.

* Dissolved
** 4 percent solids

TABLE II-9
ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Percent Removal by Primary Treatment

Pollutant	Percent Removed (1)	(2)	(3)	(4)	Proposed
Antimony	50	-	-	-	25
Arsenic	87	-	-	66	40
Beryllium	83	-	-	-	10
Cadmium	78	15	7	0	15
Chromium (T)	96	27	16	29	25
Copper	87	22	18	38	20
Cyanide (t)	60	27	-	-	25
Lead	98	57	20	51	50
Mercury	53	10	22	-	25
Nickel	93	14	6	0	15
Selenium	87	-	-	-	40
Silver	>90	20	-	-	20
Thallium	52	-	-	-	25
Zinc	88	27	26	42	30
Carbon tetrachloride	-	-	-	-	40
Chloroform	87	-	-	-	44
1,1 Dichloroethylene	66	8	-	-	32
1,2 Trans Trichloroethylene	-	36	-	-	30
Methylene Chloride	60	0	-	-	30
Phenols	85	4	-	-	45
Tetrachloroethylene	72	0	-	-	36
Toluene	57	20	-	-	40
1,1,1 Trichloroethane	73	40	-	-	35
Trichloroethylene	16	14	-	-	15

1. USEPA, Treatability Manual, Vol. III, EPA-600/2-82-001c, Sept. 1981.
2. USEPA, Fate of Priority Pollutants in POTW's EPA-440/1-82-303.
3. USEPA, Federal Guidelines, State and Local Pretreatment Programs, Vol. III, EPA -430/9-76-017c.
4. Cain, et al Development of Reasonable Limitations on Discharge of Pollutants to Municipal Sewers Industrial Waste Symposia, WPCF, Atlanta, Oct. 1983.

TABLE II-10
ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Percent Removal by Secondary Treatment

Priority Pollutant	Percent Removed (1)	(2)*	(3)	(4)	(5)	Proposed
Antimony	70	-	-	-	-	50
Arsenic	50	-	-	50	-	50
Beryllium	-	-	-	-	-	25
Cadmium	74	82	-	74	-	75
Chromium (T)	64	78	58	58	-	70
Copper	64	79	42	42	-	65
Cyanide (T)	48	48	-	48	-	50
Lead	81	58	-	74	-	70
Mercury	50	73	-	2	-	60
Nickel	40	23	17	17	-	25
Selenium	-	-	-	-	-	25
Silver	46	79	-	46	-	60
Thallium	-	-	-	-	-	25
Zinc	40	74	61	40	-	60
Carbon tetrachloride	-	-	-	-	100	90
Chloroform	99	79	-	-	96	90
1,1 Dichloroethylene	-	-	-	-	-	90
1,2 Trans Trichloroethylene	-	69	-	21	88	70
Methylene Chloride	84	48	-	47	47	60
Phenols	99	0	-	-	94	95
Tetrachloroethylene	99	55	-	-	17	70
Toluene	95	25	-	-	100	90
1,1,1 Trichloroethane	99	80	-	29	29	70
Trichloroethylene	99	89	-	-	29	80

* Adjusted for removal by primary treatment.

1. USEPA, Treatability Manual, Vol. III, EPA-600/2-82-0016, Sept. 1981.
2. USEPA, Fate of Priority Pollutants in POTW's EPA 440/1-82/303.
3. Barth et al, Field Surveys of Four Municipal Wastewater Treatment Plants Receiving Metallic Wastes, J. WPCF, 37, 1101 (1965).
4. Greeley and Hansen, Kalamazoo, Michigan Industrial Pretreatment Program, Dec. 1982.
5. Chemical Manufacturers Association CMA/EPA Five Plant Survey Study, April 1982.

TABLE II-11

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Percent Removal of Pollutants

	Percent Removed		
	Primary	Secondary	Total
Antimony	25	50	62
Arsenic	40	50	65
Beryllium	10	25	32
Cadmium	15	75	78
Chromium (T)	25	70	78
Copper	20	65	72
Cyanide (T)	25	50	62
Lead	50	70	85
Mercury	25	60	70
Nickel	15	25	36
Selenium	40	25	55
Silver	20	60	68
Thallium	25	25	44
Zinc	30	60	72
Carbon tetrachloride	40	90	94
Chloroform	44	90	94
1,1 Dichloroethylene	32	90	93
1,2 Trans Trichloroethylene	30	70	79
Methylene Chloride	30	60	72
Phenols	45	95	97
Tetrachloroethylene	36	70	81
Toluene	40	90	94
1,1,1 Trichloroethane	35	70	80
Trichloroethylene	15	80	83

Percent of pollutants removed reaching digesters:

Metals	100
Organics & cyanide	10

(d) Sludge Disposal

The sludge management plan for Elkhart is based primarily on the codisposal of dewatered, digested sludge with municipal solid wastes in a sanitary landfill. This method of disposal has been approved by the IBPH provided that the sludge is determined to be non-hazardous under the E.P. Toxicity test. To comply with this requirement, the concentration of priority pollutants in the extract from the E.P. Toxicity Test and in the dewatered sludge may not exceed the limits shown in Table II-12. Calculation of the corresponding plant influent limits is shown in Table II-13.

It is anticipated that some sludge will be disposed of on agricultural land. The amount of land at present available for this purpose is as follows:

CEC meq/100 gr	Area Acres
>15	310
5 - 15	830
<5	1,070

Under the requirements of State of Indiana Regulation 330 IAC 3.3-3-7, loading limitations on the application of metal-containing sludges, when the pH is equal to or greater than 6.5 are as follows:

TABLE II-12

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Priority Pollutants in Dewatered Sludge to Landfill

Pollutant	Existing Sludge Extract mg/l	Existing Sludge Sludge mg/kg	Existing Sludge Ratio S/E	Maximum Allowable Extract mg/l	Maximum Allowable Sludge mg/kg
Antimony	<0.01	<2.81	NA	14.6(2)	-
Arsenic	<0.005	18.3	>3,660	5.0	18,300
Beryllium	<0.01	<2.81	NA	0.0004(2)	-
Cadmium	<0.02	1.86	>93	1.0	93
Chromium (T)	<0.01	76.1	>7,610	5.0	38,050
Copper	<0.05	197	>3,940	100(2)	394,000
Cyanide (T)	0.01	3.48	348	20.0(2)(3)	7,960
Lead	<0.1	23.6	>236	5.0	1,180
Mercury	<0.0002	1.17	>5,859	0.2	1,170
Nickel	0.47	26.4	56	1.3(2)	72
Selenium	<0.005	<2.61	NA	1.0	-
Silver	<0.1	6.95	>69	5.0	345
Thallium	<0.01	<2.81	NA	1.3(2)	-
Zinc	<0.05	213	>4,260	500(2)	2,130,000
Phenols	<0.1	<12	>120	350(2)	42,000

1. Extract from EP Toxicity Test.
2. Estimated at 100 times EPA water quality standard for human health (10-6).
3. Assumed to be 100% Cyanide (A).
   NA - Not applicable.

TABLE II-13

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

POTW Influent Limits Based on Sludge Landfill

Pollutant	Concentration, mg/l			
	Existing Influent	EP Toxicity		Allowable Influent(1)
		Existing	Limit	
Arsenic	<0.0025	<0.005	5.0	2.5
Cadmium	<0.02	<0.02	1.0	1.0
Chromium (T)	<0.10	<0.01	5.0	50
Copper	0.10	<0.05	100	200
Cyanide (T)	0.01	0.01	20	20
Lead	<0.10	<0.1	5.0	5.0
Mercury	<0.0005	<0.0002	0.2	0.5
Nickel	0.14	0.47	1.3	0.4
Silver	<0.05	<0.1	5.0	2.5
Zinc	0.06	<0.05	500	600

(1) Allowable Limit = $\frac{\text{EP Toxicity Limit x Existing Influent}}{\text{Existing EP Toxicity}}$

Metal	Maximum Metal Addition in lb/acre (kg/ha) when Soil Cation Exchange Capacity (meq/100 gr)* is: <5	5-15	>15
Lead	446 (500)	892.5 (1,000)	1785 (2,000)
Zinc	223 (250)	446 (500)	892.5 (1,000)
Copper	111.5 (125	223 (250)	446 (500)
Nickel	111.5 (125)	223 (250)	446 (500)
Cadmium	4.5 (5)	9 (10)	18 (20)

* Cation exchange capcity determined on soil prior to sludge application by the pH 7 ammonia acetate procedure.

The annual application of cadmium may not exceed 0.5 kilograms per hectare on land used for the production of tobacco, leafy vegetable, or root crops grown for human consumption. For other feed-chain crops the annual cadmium application rate may not exceed the following:

Time Period	Annual Cd Application Rate lb/acre	kg/hg
Until June 30, 1984	1.78	2.00
July 1, 1984 to Dec. 31, 1986	1.11	1.25
Beginning January 1, 1987	0.45	0.50

Based on the above data and a project life of 15 years, the limiting concentrations of the metals of concern in the sludge are as follows:

Metal	Concentration mg/kg
Lead	8,300
Zinc	4,400
Copper	2,200
Nickel	74
Cadmium	

4. Evaluation of Data

Table II-14 compares the existing concentrations of toxic substances with the limits discussed above.

(a) From an examination of the data in Table II-14, it is apparent that the concentrations of copper, cyanide and nickel have exceeded the estimated tolerance limits of the activated sludge process. None of the toxic substances in the sludge exceed the estimated tolerance limits of the anaerobic digestion process.

(b) As shown in Table II-14, the concentration of copper, cyanide and silver in the plant effluent have approached or exceeded the allowable concentration based on dilution by 50 percent of the 7-day, 10-year minimum river flow.

(c) The data in Table II-14 indicate that none of the toxic pollutants in the dewatered sludge are present in concentrations high enough to prevent its codisposal with municipal solid wastes in a sanitary landfill. The data also indicate that disposal by application to agricultural land will not be hampered by the presence of toxic materials.

TABLE II-14

ELKHART, INDIANA
INDUSTRIAL PRETREATMENT PROGRAM

Evaluation of Data

	Concentration (1)									
	Activated Sludge		Sludge Digestion		Effluent		Landspread		Landfilled	
Pollutant	Influent	Limit(2)	Actual	Limit	Actual	Limit(3)	Actual	Limit	Actual	Limit
Antimony	<0.01	0.13	<4.5	25	<0.01	16.30	<4.5	-	<2.81	-
Arsenic	<0.005	0.08	3.9	1,000	<0.005	1.30	3.9	-	18.3	18,300
Beryllium	<0.01	0.11	<0.5	12.5	<0.01	0.05	<0.5	-	<2.81	-
Cadmium	0.08	1.18	<15	2,375	<0.02	0.24	<15	74	1.86	93
Chromium (T)	0.17	13.33	668	2,000	0.15	3.19	668	-	76.1	76,100
Copper	1.61	1.25	1,370	3,750	0.38	0.19	1,370	2,200	197	394,000
Cyanide (T)	0.29	0.13	22.6	3,000	0.23	0.27	22.6	-	3.48	796
Lead	<0.10	0.20	169	4,250	<0.10	0.54	169	8,300	23.6	1,180
Mercury	0.0006	0.13	3.4	875	0.0006	0.005	3.4	-	1.17	1,170
Nickel	1.45	1.18	199	2,000	0.69	6.50	199	2,200	26.4	72
Selenium	<0.005	0.17	<5.5	1,750	<0.005	0.35	<5.5	-	2.61	-
Silver	<0.05	6.25	27.6	300	<0.05	0.054	27.6	-	6.95	345
Thallium	<0.01	0.13	<4.5	12.5	<0.01	0.41	<4.5	-	<2.81	-
Zinc	0.60	1.43	2,080	5,000	0.13	13.05	2,080	4,400	213	2,130,000
Carbon tetrachloride	0.031	5	ND	250	0.0076	14.34	ND	-	ND	-
Chloroform	0.068	2	ND	200	ND	12.51	ND	-	ND	-
1,1 Dichloroethylene	0.050	15	ND	175	ND	4.73	ND	-	ND	-
1,2 Trans Dichloroethylene	0.036	14	ND	1,250	0.007	4.73	ND	-	0.130	-
Methylene Chloride	0.042	143	ND	1,250	0.020	1.02	ND	-	0.080	-
Phenols	0.250	91	7.4	200	<0.1	1.28	7.4	-	<12	42,000
Tetrachloroethylene	0.023	31	ND	37.5	0.014	8.56	ND	-	0.017	-
Toluene	0.037	33	ND	5,375	0.004	7.13	ND	-	1.90	-
1,1,1 Trichloroethane	0.003	46	ND	125	NQ	95.76	ND	-	ND	-
Trichloroethylene	0.078	24	ND	250	0.016	18.34	ND	-	ND	-

(1) Digested sludge concentration in mg/kg, others in mg/l.
(2) Prior to removal by primary treatment.
(3) Based on 20 mgd effluent and 50% of 490 mgd 7-day, 10-year minimum flow.
ND - Not detected.
NQ - Not quantifiable.

(d) The priority pollutants required to be controlled under promulgated EPA Categorical Standards are listed in Table II-15 and are summarized as follows:

Arsenic	Silver
Cadmium	Zinc
Chromium	Benzene
Copper	Chloroform
Cyanide	Methylene Chloride
Lead	Toulene
Nickel	Total Toxic Organics

The above list of toxic substances includes all of those present in concentrations high enough to cause problems related to plant operation, sludge disposal or water quality in the St. Joseph River. Monitoring of toxic substances will, therefore, be limited to these pollutants plus mercury.

The industries whose discharge will be controlled by the City and the pollutants contributed by each are listed in Attachment V.

5. Recommendations

(a) Local Standards

In addition to the general and specific prohibitions required under 40 CFR 403.5, local standards should be established for for following priority pollutants:

Arsenic	Lead
Cadmium	Mercury
Chromium	Nickel
Copper	Silver
Cyanide	Zinc

TABLE II-15

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Priority Pollutants Regulated by Categorical Standards

Categorical Standard	Priority Pollutant													
	Arsenic	Cadmium	Chromium	Copper	Cyanide	Lead	Nickel	Silver	Zinc	Benzene	Chloroform	Methylene Chloride	Toulene	Total Toxic Organics
Aluminum Forming			X		X				X					
Copper Forming			X	X		X	X		X					
Electrical and Electronic Components	X													X
Electroplating and Metal Finishing		X	X	X	X	X	X	X	X					
Organic Chemicals Manufacturing												X		
Pharmaceuticals Manufacturing					X					X	X	X	X	

A series of computations have been made to determine the maximum permissible concentrations of the above toxic substances in the POTW influent that will not interfere with the operation of the plant, cause a violation of the water quality standards, or prohibit the planned methods of sludge disposal. The methodology used is described in Attachment XIII. Table II-16 summarizes the results of these computations for each toxic substance. The lowest values, which determine the local influent limits, are underlined.

To establish the limiting concentration of each pollutant that may be discharged by industries, it is necessary to deduct from the allowable load at the POTW, the amount of each pollutant in domestic and commercial wastes and then calculate the concentration of the remainder in the industrial flow.

The data obtained from the Industrial Survey include estimates of the amounts of process wastes and contact cooling water containing each of these chemicals. It is anticipated that such industrial discharges will increase in proportion to the estimated increase in total flow to the wastewater treatment plant.

The local limits calculated in this manner for a design total flow of 20 mgd are shown in Table II-17. Most of the computed limits are higher than those permitted under various categorical standards. In such cases, the local limits have been based on the categorical limits. The selected local limits

TABLE II-16

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Summary of POTW Influent Limits

	POTW Influent Limit mg/l				
	Water	POTW Tolerance		Sludge Disposal	
Pollutant	Quality	Act. Sludge	Sl. Digestion	Landfill	Landspread(1)
Arsenic	3.71	0.08	0.49	2.5	-
Cadmium	1.09	1.17	0.97	1.0	0.02
Chromium (T)	14.50	13.33	0.82	50.0	-
Copper	0.68	1.25	1.66	200.0	0.59
Cyanide (T)	0.71	0.13	1.55	20.0	-
Lead	3.60	0.20	1.60	5.0	1.94
Mercury	0.02	0.13	0.40	0.5	-
Nickel	10.15	1.17	1.78	0.4	1.19
Silver	0.17	6.25	0.14	2.5	-
Zinc	46.61	1.42	2.22	600.0	1.21

1. Secondary method of disposal - not limiting factor.

TABLE II-17

ELKHART, INDIANA
MUNICIAL PRETREATMENT PROGRAM

Priority Pollutant Limits for Industrial Effluents

Pollutant	Industry Flow mgd	Concentration - mg/l POTW Limit(1)	Domestic Sewage	Industrial Effluents
Arsenic	0.057	0.08	0.002	27.37
Cadmium	1.842	0.97	0.003	10.50
Chromium (T)	1.970	0.82	0.050	7.87
Copper	1.978	0.68	0.060	6.33
Cyanide (T)	1.271	0.13	0.020	1.75
Lead	1.878	0.20	0.050	1.65
Mercury	0.008	0.02	10^{-7}	50.00
Nickel	1.895	0.40	0.020	4.03
Silver	0.137	0.14	0.003	20.00
Zinc	1.970	1.42	0.130	13.23

Total Flow - 20.0 mgd

(1) From Table II-16

included in the proposed sewer ordinance and the corresponding limits in present sewer ordinance are as follows:

Pollutant	Limiting Concentration, mg/l Existing	Proposed
Arsenic	-	2.10
Cadmium	0.20	1.20
Chromium (T)	0.25(1)	7.00
Copper	2.00	4.50
Cyanide (T)	0.64	1.75
Lead	1.00	0.60
Mercury	0.02	0.02
Nickel	0.80	4.10
Silver	0.10	1.20
Zinc	0.50	4.20

(1) Hexavalent

Except for lead and mercury, the new local limits are higher than the existing limits.

(b) Comparison of Local and Categorical Standards

Categorical standards promulgated in final form and the industries to which they apply are listed in Table II-18. Limits established under categorical standards apply to process flows and, therefore, cannot be directly compared to the local limits, which apply to the industrial effluent, including domestic wastes. In addition, some categorical standards are related to production rates rather than wastewater concentration. Determination of the controlling limit for a specific discharger, therefore, requires a detailed analysis for each industrial user. This will be done when discharge permits are issued.

TABLE II-18

ELKHART, INDIANA
MUNICIPAL PRETREATMENT PROGRAM

Industries Subject to Categorical Standards

Industries	Categorical Standard					
	Aluminium Forming	Copper Forming	Electrical and Electronic Components	Electroplating and Metal Finishing	Organic Chemicals Manufacturing	Pharmaceutical Manufacturing
AACOA				X		
Anderson Silver Plating, Inc.				X		
W. T. Armstrong				X		
Vincent Bach I				X		
CTS Main			X	X		
CTS Plastics			X			
Durakool			X			
Elixer Industries	X					
Elkhart Products	X	X				
Hermaseal			X			
ILC Products	X					
Ideal Plating				X		
Kiefer and Sons				X		
McDowell Enterprises				X		
Miles Laboratories					X	X
NIBCO, Inc.	X	X		X		
Selmer Company				X		
Teledyne	X					
Whitehall Laboratories, Inc.						X

(c) Inform Industries

A public meeting was held in May 1984 to inform interested persons of the pretreatment program. The purpose and date of the meeting was announced in a local newspaper and on local radio and television new programs. A notice was sent to affected industries and interested organizations and individuals.

6. Industrial Residuals Management

The nature and amounts of industrial residuals, as reported in the Industrial Survey Questionnaires, are summarized in Table II-19. The total quantity reported is 415 tons, or 103,750 gallons per year assuming 1 gallon weights 8 pounds. Of these amounts 85 tons (21,250 gallons) per year are collected by firms specializing in recycling or reclaiming materials. The balance is disposed of directly to landfills.

It is assumed, for purposes of developing the preteatment program, that all industries with residuals have been identified. Implementation of the program will require some additional industries to provide pretreatment and dispose of the resulting residue. All industries providing pretreatment will be required to provide data regarding the disposal of such residues as required under the Sewer Use Ordinance and CFR 40 116 and 117 and will be monitored to ensure compliance.

Residues from pretreatment facilities may constitute hazardous wastes subject to control under the Resource Conservation and Recovery Act (RCRA). It is the responsibility of each pretreatment

TABLE II-19
ELKHART, INDIANA
INDUSTRIAL PRETREATMENT PROGRAM

Residual and Sludge Removal

INDUSTRY	RESIDUAL	QUANTITY	HAULER
1. Anderson Silver Plating Company	Filter Aids and Carbon Silver Strip Sludges	800-1000 lb/yr both residuals combined	Ashland Chemical South Bend, Ind.
2. W.T. Armstrong	Cyanide bearing sludges	6250 lb/yr	Nelson Indus. Svs. 12345 Schaefer Hwy. Detroit, Mi. 48000
3. Atlas Chem Milling Company	Ferric Chloride	40,000 gpd	K.A. Steel Chem. 2050 Hawthorn Ave. Melrose Park, Ill. 60160
4. Vincent Bach 1 & 2	Trichlorethylene Lacquer Stripper Thinner	39,600 lb/yr 550 gal/yr 220 gal/yr	Gold Shield Solvents 2263 Distributers Dr. Indpls., Ind. 46241 A-1 Disposal Corp. 400 Broad Street Plainwell, Mi. 49080

(Continued)

TABLE II-19 (Cont.)

INDUSTRY	RESIDUAL	QUANTITY	HAULER
5. Bergerson Screw Products	"Detrex" Degreaser	495-990 gal/yr	Gold Shield Solvents 2263 Distributers Dr. Indpls., Ind. 46241
6. E.K. Blessing Co.	Trichloroethene	990 gal/yr	Gold Shield Solvents 2263 Distributers Dr. Indpls., Ind. 46241
7. Domore Corp.	Paint Sludges Flammable Liquids	435 lb/yr 565 lb/yr	Chemsolv, Inc. South Bend, Ind.
8. Don's Printing Service	Silver Bearing Film Fixer		Sun Metals South Bend, Ind.

(Continued)

TABLE II-19 (Cont.)

INDUSTRY	RESIDUAL	QUANTITY	HAULER
9. Elkhart Products	Trichloroethylene Chromic Acid Sodium Hydroxide Flakes	120651 lb/yr 591 lb/yr 910 lb/yr	Berreth Oil Mishawaka, Ind. Chemsolv/S. Bend, In. Gold Shield/Indpls. A-1 Disposal/Plainwell Mich.
10. Federal Paperboard	Printing Inks Solvents Sludges	11,600 gpy or 90,700 lb/yr all residuals combined	A-1 Disposal 400 Broad Street Plainwell, Mich. 49080
11. Hermaseal	Contaminated Oil Mixture	55 gpy	None
12. ILC Corporation	Tri-chrome Sludge Paint Sludge	45000 lb/yr 26000 lb/yr	Adam's Landfill Ft. Wayne, Ind.

(Continued)

TABLE II-19 (Cont.)

INDUSTRY	RESIDUAL	QUANTITY	HAULER
13. Ideal Plating	Cyanide Bearing Sludge	825 gpy	ILWD, Inc. 7901 W. Morris St. Indpls,, Ind. 46231
14. Kent Company	Trichloroethene Sludge	550 gpy	Gold Shield Solvents 2263 Distributers Dr. Indpls., Ind. 46241
15. McDowell Enterprises	Trichloroethylene Nickel Stripper Chromic Sludge Zinc Sludge Cadmium Sludge Misc. Sludge	4840 lb/yr 10560 lb/yr 1320 lb/yr 1980 lb/yr 2640 lb/yr 2640 lb/yr	Chemsolv Nelson Indus. Svs. 12345 Schaefer Hwy. Detroit, Mi. 48000 "
16. NIBCO, Inc.	Degreasing Oil Chromic Acid	3850 gpy 25 gpy	McKesson Envirosystms Chem-Resources Recov. Chemsolv, Inc. Nelson Indus. Svs.

(Continued)

TABLE II-19 (Cont.)

INDUSTRY	RESIDUAL	QUANTITY	HAULER
17. Philips Industries	Paint Sludge Washer Sludge	1650 gpy Both residuals combined	Himco Waste-Away Elkhart, Ind. to Elkhart County Landfill
18. Selmer Company	Trichloroethylene	165 gpy	Gold Shield Solvents 2263 Distributers Dr. Indpls., Ind. 46241
19. Taylor Products	Trichloroethane VG and Water Solutions	8000 gpy	Continental Waste Systems Ft. Wayne, Ind.
20. Teledyne Metal Forming Corp.	Sludge containing traces of zinc, lead, silver, chromium, copper, nickel, arsenic, barium, mercury, and selenium	exact amount unknown	ILWD , Inc. 7901 W. Morris St. Indpls., Ind. 46231

(Continued)

TABLE II-19 (Cont.)

INDUSTRY	RESIDUAL	QUANTITY	HAULER
21. Truth Publishing Company	Printing Ink	300-600 gpy	Himco Waste-Away Elkhart, Ind. to Elkhart County Sanitary Landfill

facility operator to determine whether the residue is a hazardous waste. The Act includes criteria for identifying hazardous wastes and regulations controlling their storage, transportation and disposal.

Each generator of hazardous wastes has the following options:

- Storage, with transportation and disposal by others
- Storage and transportation to a disposal site operated by others
- Storage, transportation and off-site disposal
- On-Site disposal

Depending on the option selected, the generator will be subject to one or more of the regulations for:

- Hazardous Waste Generators
- Hazardous Waste Transporters
- Owners and Operators of Hazardous Waste Facilities

It is expected that in most, if not all cases, the pretreatment facility operators will select the first option. A summary of the RCRA regulations for hazardous waste generators is attached.

C. Activity Two

I. Legal Authority

The existing sewer use ordinance has been modified to comply with the guidelines established by the Environmental Protection

Agency. A copy of the proposed ordinance is given in Attachment X. It has not yet been adopted by the City.

The proposed ordinance is based on the model ordinance developed by the USEPA. The City Attorney has expressed the opinion that it provides the City with the legal authority required by Section 403.8 (f)(1). His statement of legal authority is given in Attachment XI.

II. Evaluation of Revenue

1. Estimated Cost

(a) At the present time, the City of Elkhart is planning to implement the pretreatment program through the Wastewater Treatment Plant. Qualified personnel have been hired to implement the program. A rough estimate of pretreatment program operational cost is given in Attachment VI. Work-hours per year were estimated for each task. Five (5) employees will be working directly on the program after implementation. These positions are described in attachment VIII. The availability of these five individuals will be related to the work load pertaining to the pretreatment program. Within the Wastewater Laboratory, scheduling will be arranged to help implement the program.

(b) The cost of analyzing industrial samples will be approximately $16,900. The cost of analyzing POTW samples will be approximately $4,900. Analyses included in the cost are metals, cyanides, oil and grease, BOD, suspended solids and volatile organics by gas chromatography. The appropriate number of samples

per year was determined and then multiplied by an estimated analytical cost per pollutant analysis.

(c) The following table compares the estimated cost for performing lab analysis in house with the cost of having a private lab perform the work.

	POTW Cost	Private Lab Cost
Industrial Samples	$19,600	$23,100
POTW Samples	$ 4,900	$ 5,800

The lab building and equipment are being funded through construction grants.

(d) General administrative costs, printing, supplies, etc. will be approximately $1,000 per year.

(e) Information/data management system costs will be incorporated through the clerks salary. The clerk will maintain most of the filing system.

(f) Facility overhead costs associated with operation of the program will be incorporated with the normal operating costs of the Wastewater Treatment Plant laboratory. Since the pretreatment program will be managed from the Treatment Plant, some of the costs will be overlapping and difficult to differentiate between the two budgets.

(g) With the Construction of a new laboratory facility due for completion in 1984 (including all new equipment), the replacement cost for laboratory equipment will not be a concern for several years. The gas chromatograph, atomic absorption

unit, balances and pH meters should last between five (5) and ten (10) years.

2. Estimated Revenue

(a) Attachment VII lists the sources of revenue for the program and the amount of revenue to be generated.

(b) Section 9.13.2 of the proposed ordinance includes fees to provide the revenue to operate the pretreatment program.

(c) The Sewer Use and Rate Ordinance contains provision for an annual review and adjustments to reflect actual program costs. This review may contain recommendations to the Board of Works for amendments to this ordinance. Program costs will be monitored closely, as will revenues.

The estimated program cost of $76,428 is approximately equal to the estimated revenue of $75,860.

III. Evaluation of Available Personnel

At the present time, the City of Elkhart's Wastewater Treatment Plant is undergoing a major expansion. The staff is being reorganized for implementation of the pretreatment program. Two additional employees have recently been hired for the Wastewater laboratory. Both will be available for work within the pretreatment program. Two additional employees in the City of Elkhart will be transferred to the Wastewater Laboratory. This will provide 5-6 employees that will be available for work on the pretreatment program.

The allocation of personnel will be dependent upon work load associated with the pretreatment program.

1. In Attachment VIII we have provided job descriptions of the positions required for implementation and operation of the City of Elkhart's pretreatment program. Although several of these positions will not be dedicated full-time to the pretreatment program, these personnel will be available on an as-needed basis. The flexibility in these positions will allow for scheduling and setting priorities for projects at the Wastewater Treatment Plant. This flexibility will also allow for scheduling in conjunction with weather conditions. We anticipate that additional summer employees may be utilized for a more intensive monitoring/sampling schedule. During inclement weather and the winter months provisions will be made for indoor monitoring/analyses and other tasks.

The people presently employed represent a diversified educational and experience background and are considered to be qualified for these positions.

2. It is anticipated that two additional laboratory employees will have to be hired. These additional positions will include a chemist and lab technician. These new employees will be utilized for routine lab analysis in relation to the plant's NPDES permit. The employees cited in Attachment VI will be used almost exclusively for implementation of the pretreatment program, although some reorganization of personnel is anticipated. Summer employees

may also be utilized in monitoring/analysis activities for the pretreatment program. The additional personnel will be budgeted for the 1985 fiscal year. These people will also be available if needed to help implement the pretreatment program.

3. An organization chart is attached.

D. Activity Three

I. Industrial Monitoring Procedures

The City of Elkhart will be operating its municipal pretreatment program on a permit system. In order to implement a workable program, the following procedures will be instituted:

1. Any new industry will be required to submit an Industrial Survey Questionnaire to determine its manufacturing processes and the nature of its discharge (Sewer Use Ordinance Section 3.2.2). The Pretreatment Director will also maintain contact with the Chamber of Commerce and others in order to keep abreast of new industries, of expanding industries, or of industries leaving the city.

2. A second part of the permit requirements will require the industries to keep the POTW informed as to any changes made to their processes which will effect or have the potential to effect their wastewater discharge characteristics (Sewer Use Ordinance 3.2.4 (i)). These reports should be made prior to the modifications in order to enable the City to determine what effect the changes will have on the POTW, what, if any, pretreatment

facilities will be required, and to allow the City to inspect the industry to assure compliance with Federal, State, and Local regulations. These reports will be submitted in writing to the Pretreatment Director.

3. Once the City has an approved pretreatment program, it will notify industry of new or changed pretreatment regulations and standards (Sewer Use Ordinance Section 2.2) by certified mail with a return receipt requested. These letters will be mailed to all effected industries as soon as possible upon receipt of new regulations, etc. by the City. However, failure to receive this information from the City will not absolve any industry from liability for non-compliance with federal pretreatment regulations.

4. All discharge permits will be issued by the Office of the Pretreatment Director upon payment of all required fees and submission of approved applications (Sewer Use Ordinance Section 3.2.1). All applications will be submitted to the Office of the Pretreatment Director for review and approval. All reports (baseline reports, plans and specifications, self-monitoring reports, etc.) will be submitted to the Office of the Pretreatment Director for analysis by the POTW staff (Pretreatment Director, Lab Director, Inspector, etc.) and kept on file at the POTW. All discharge permits will be conditional pending approval by the State Plan Review Section of the Indiana State Board of Health.

5. Significant violators will be listed at least once annually in a public notice published in the daily newspaper, The Elkhart Truth (Sewer Use Ordinance Section 3.6). Significant violators are defined as per 40 CFR 403.8 (f) (vii).

6. Any industry which feels that part of its data should be confidential will be allowed to request that these data be kept confidential (Sewer Use Ordinance Section 3.7). These requests should be limited to production data or raw materials usage data which could be used for improper purposes. All data determined to warrent confidentiality will be stored in a file separate from all other data and not open for public scrutiny.

7. Inspections of industrial dischargers will be undertaken as follows (Sewer Use Ordinance Section 3.5):

a. Prior to issuance or renewal of discharge permits, an inspection will be performed to verify information on file for the industry and to determine what changes, if any, have occurred in-plant since the permit was last issued or renewed.

b. On an as-needed basis, with reasonable notice, at the request of either the city or industry to clarify information or assure compliance with regulations.

8. Industrial monitoring procedures will be as follows:

a. Scheduled industrial monitoring will be primarily based upon daily flow (Sewer Use Ordinance Section 3.2.4 (e)). The number of samples per year will be related to the number of gpd discharged (may be a combination of self-monitoring and city monitoring, see Paragraph 9). The number of samples required may be greater for industries which cause repeated problems for the POTW. Attachment V shows the proposed schedule of monitoring for industries.

b. Unscheduled monitoring will be performed when there is reason to suspect violation of the sewer ordinance or when a particular industry is suspected of causing POTW upsets (Sewer Use Orinance Section 3.5). The violating industry will be charged for any costs incurred by the POTW for this monitoring, plus any fines or penalties which may be imposed.

c. Demand monitoring may be performed any time plant upsets or potential upsets occur (Sewer Use Ordinance Section 2.11). Industries will be required to notify the POTW immediately upon the event of an accidental spillage. The City has a 24 hour phone number available for such notification and will take whatever steps are necessary to minimize the damage or potential damage caused by

the spill. The City will work closely with industry to develop a workable spill contingency plan if one does not already exist.

9. Industry will be required by the terms of the permit to provide self-monitoring analyses to the POTW based upon flow rates, etc. as per 40 CFR 403.12 (Sewer Use Ordinance Section 3.2.4 (e)). In some cases, the number of analytical tests required may be a combination of self-monitoring and city monitoring. Failure to submit the required number of analyses could result in fines and penalties under City Sewer Use Ordinance Sections 4.2 and 5.1.

10. The Municipal Pretreatment Program will be reviewed annually by a committee consisting of the City Engineer, WWTP Superintendent, WWTP Assistant Superintendent, Lab Director, Pretreatment Director, Industrial Inspector, and any other person whose input may be of benefit to the program. The program will be analyzed and any changes required may be discussed and implemented by this committee. Industry will be informed in writing of any changes in procedure or regulations.

II. POTW Monitoring Procedures

1. The Elkhart Wastewater Treatment influent, effluent and sludge product will be monitored on a monthly basis. Pollutants monitored will include those known to be discharged into the sewage system. Monitoring data will be used to check POTW

loadings and how well the plant is removing pollutants. Final effluent and sludge characteristics will also be reviewed closely. Samples will be taken according to flow and pumping rates with a lag of one detention time between influent and effluent samples.

2. Sample collection, preservation, and analysis techniques and procedures will be in accordance with the current editions of Standard Methods for the Examination of Water and Wastewater and EPA Manual of "Methods for Chemical Analysis of Water and Wastes." All procedures will incorporate quality control techniques where applicable. Quarterly quality control checks will be used to monitor accuracy and precision of the test and the analyst. The samples taken for analysis will be representative of the Wastewater process based on flows and detention times.

It is anticipated that of a full-service laboratory capable of complete analysis of industrial wastewater will be developed. Services of a private lab may be used for quality assurance purposes only.

3. The Elkhart Wastewater Laboratory anticipates and intends to use only those methods that are EPA approved when analyzing industrial and POTW samples.

III. Additional Equipment and Facilities

1. At the present time, the Elkhart Wastewater Treatment Plant is undergoing a major plant expansion through grant funding.

This includes a new laboratory building and new laboratory equipment. The following list is a partial representation of the equipment on order:

1. Laboratory apparatus
2. Base cabinets, floor and wall cases
3. Counter tops, reagent and service shelves
4. Sinks
5. Fume hoods
6. Autoclave
7. Refrigerator/freezer
8. Incubator
9. Microscope
10. Water bath
11. Demineralizer
12. TOC Analyzer
13. Balance
14. Gas Chromatograph
15. Muffle furnace
16. Kjeldahl apparatus
17. PH meter-titrator
18. Centrifuge
19. Spectrophotometer
20. Conductivity meter
21. D.O. Meter
22. Atomic absorption unit
23. Glassware

A complete list of lab equipment and facilities will be supplied upon request. The POTW anticipates purchasing additional sampling, flow measuring, and recording equipment as noted in Attachment VI.

2. Additional sampling/flow measuring equipment is grant eligible and will be purchased on this basis. Any additiional lab equipment will be purchased through the lab budget for 1985.

IV. Compliance Tracking and Filing System

1. Compliance Tracking

The compliance tracking procedures for investigating instances of non-compliance as indicated in the reports required under 40 CFR 403.12 or by industrial self-monitoring reports and POTW inspection and surveilance activities include:

- Entering industrial users name and date of report on log of non-compliance incidents.
- Informal notice (telephone) to industrial user.
- Informal discussion of cause and means to correct violation and agreement as to means and schedule for correction.
- Follow-up inspection and sampling.
- Formal notice (letter by certified mail, return receipt requested) at any point in above procedures that it appears satisfactory progress is not being made.
- Additional inspection and sampling as required.
- Enter all reports and notices in industrial users file.
- Enter date of compliance on log of non-compliance incidents.

2. Enforcement Procedures

When an industrial user refuses to agree to a reasonable schedule to correct a violation; fails to comply with an agreed upon schedule to correct a violation; or is judged to be a persistent or repeated violator of the regulations, the following procedures will be followed, as appropriate:

- Formal notification by letter directing the industrial user to appear before the Board of Works and Safety of the City of Elkhart to show cause why the user should not be fined or have service suspended.

- Imposition of a fine of not less than $1000.00 nor more than $2,500.00 for each day a willful violation continues.

- Imposition of a fine or penalty of not more than $2,500.00 for each day a non-willful violation (accidental discharge or spill) continues.

- Issuance by the Board of an order to cease and desist and directing the user to (a) comply forthwith, (b) comply with a time schedule set forth by the Board, or (c) take appropriate or remedial action.

- Petition by the Board to any court of proper jurisdiction for the issuance of a preliminary or permanent injunction or both, as may be appropriate, in restraining the continuance of the violation.

- Revocation of the discharge permit of the industrial user or termination of wastewater service in whole or in part.

3. Records Retention

A manual records file will be established for each industrial user subject to the monitoring and enforcement plan. The files will be arranged in alphabetical order and stored in metal filing cabinets in the office of the Pretreatment Director.

Each industrial user file will contain copies of all correspondence, reports and data regarding that user. The records will be retained for not less than 3 years.

All industrial users will also be required to return records for not less than three years.

V. Forms

Copies of forms to be used by the POTW in operating the pretreatment program are attached. They include the following:

- Private Waste Disposal Application
- Residential Building Sewer Application
- Commercial Building Sewer Application
- Industrial Sewer Application
- Wastewater Discharge Permit
- Pretreatment Compliance Date Report
- Periodic Compliance Report/Self-Monitoring Report
- General Wastewater Discharge Permit